

ISSN 1682-1750

THE INTERNATIONAL ARCHIVES OF THE PHOTOGRAMMETRY, REMOTE SENSING AND SPATIAL INFORMATION SCIENCES
ARCHIVES INTERNATIONALES DE PHOTOGRAMMÉTRIE, DE TÉLÉDÉTECTION ET DE SCIENCES DE L'INFORMATION SPATIALE
INTERNATIONALES ARCHIV FÜR PHOTOGRAMMETRIE, FERNERKUNDUNG UND RAUMBEZOGENE INFORMATIONSWISSENSCHAFTEN

PROCEEDINGS

VOLUME
VOLUME
BAND

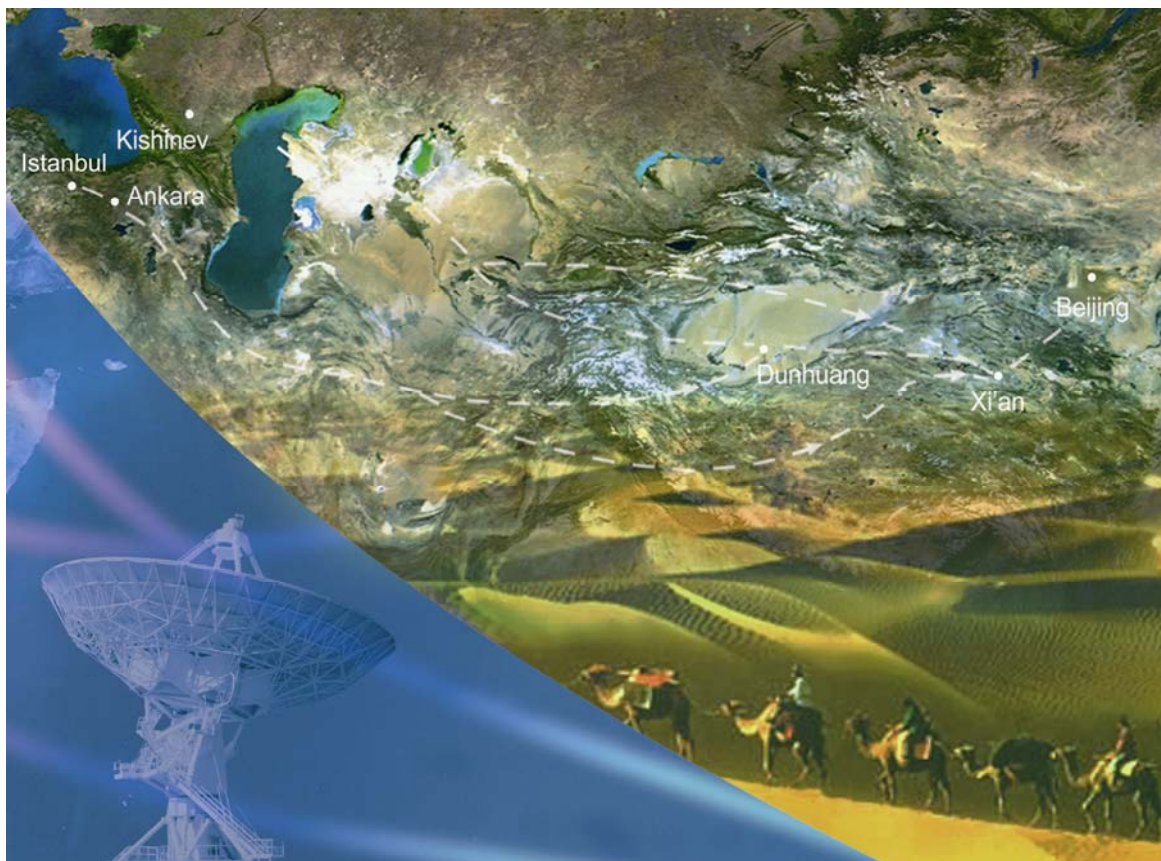
XXXVII

PART
TOME
TEIL

B1

COMMISSION
COMMISSION
KOMMISSION

I



Edited by:
CHEN Jun, JIANG Jie, Alain BAUDOIN

This compilation © 2008 by the International Society for Photogrammetry and Remote Sensing. Reproduction of this volume or any parts thereof (excluding short quotations for the use in the preparation of reviews and technical and scientific papers) may be made only after obtaining the specific approval of the publisher. The papers appearing in this volume reflect the authors' opinions. Their inclusion in this publication does not necessarily constitute endorsement by the editors or by the publisher. Authors retain all rights to individual papers.

Copies of this book/CDROM are available from:

Reed Business - Geo (former GITC) by
P.O.Box 112
8530 AC Lemmer
The Netherlands
Tel: +31 (0) 514 56 18 54
Fax: +31 (0) 514 56 38 98
E-mail: geo@reedbusiness.nl
<http://www.reedbusiness-geo.nl>

Copyright 2008

ISPRS Council 2004-2008

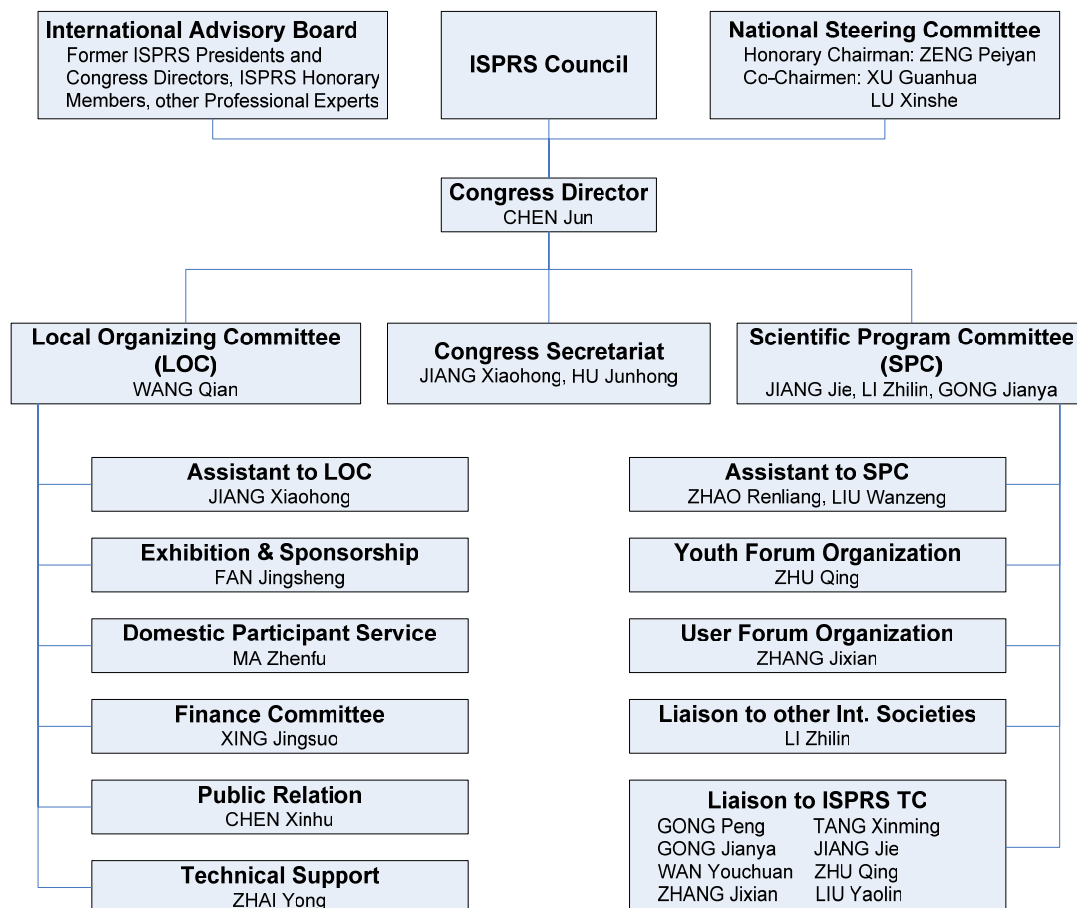
President	Ian Dowman	United Kingdom
Secretary General	Orhan Altan	Turkey
Congress Director	Chen Jun	P. R. China
First Vice President	John Trinder	Australia
Second Vice President	Emmanuel Baltsavias	Switzerland
Treasurer	Stanley Morain	USA

Technical Commission Presidents 2004-2008

Commission I	Alain Baudoin	France
Commission II	Wolfgang Kainz	Austria
Commission III	Wolfgang Foerstner	Germany
Commission IV	Shailesh Nayak	India
Commission V	Hans-Gerd Maas	Germany
Commission VI	Kohei Cho	Japan
Commission VII	John van Genderen	The Netherlands
Commission VIII	Ammatzia Peled	Israel

In cooperation with Working Group Chairpersons responsible for the reviewing of extended Abstracts and acceptance of contributions. Authors delivered camera ready manuscripts and selected the keywords.

Congress Organising Committee



Introduction

During the 2004-2008 period Technical Commission I of ISPRS « Image Data Acquisition – Sensors and Platforms » has organised 14 workshops and its Symposium took place in Marne-la-Vallée (France) in July 2006. These events were already opportunities to present and discuss the state of the art and progresses of image acquisition techniques within the 8 working groups of the Commission.

But the Congress of ISPRS, which takes place every four years, is for each of us interested in photogrammetry, remote sensing and spatial information sciences, a new major opportunity to meet more people and to present our work to a much wider community.

For this Congress 300 abstracts related to the terms of reference of TC I have been accepted to be presented and all the available full papers are published in this volume of the ISPRS Archives.

They reflect the very large variety of topics of the Commission, showing the progress accomplished during the past years and the innovations which could be very helpful in the future. Some of them could be mentioned:

- More and more space imagery is available (a dozen of Earth Observation satellites have been launched since the past Congress in Istanbul) with better resolution.
- New internet services have been developed and have stimulated the development of many applications.
- The generation of DEMs from space has become fully operational.
- The interest of using together different space systems combined with in-situ observations, will be effective with the implementation of the Global Earth Observation System of Systems (GEOSS)
- The use of LiDAR systems is significantly increasing, due to major improvements allowing higher quality.
- Digital aerial cameras are reaching nearly full maturity, providing the radiometric quality of remote sensing and the geometric accuracy of photogrammetry.
- Ground based mobile mapping systems are developing very fast to acquire panoramic or stereo imagery and also laser clouds that can be used to enrich the content of 3D City models built from aerial and satellite imagery.

I would like to thank all who have contributed to this work during this 4 year period and especially, the Secretary of the Commission, Nicolas Papanoditis, and the Working Group Chairs: Charles Toth, Vincent Tao, Jon Mills, Karsten Jacobsen, Ugar Murat Leloglu, Ron Li and Naser El-Sheimy.

Alain Baudoin
President of ISPRS Technical Commission I

Table of Contents

WG I/1 Standards, Calibration and Validation

Image-Based Estimation and Validation of NIRS for High-Resolution Satellite Images <i>Taejung Kim, Hyunsuk Kim, and HeeSeob Kim</i>	1
Evaluation of Camera Calibration Approaches for Video Image Detection Systems <i>S. Bauer, A. Luber, R. Reulke</i>	5
Using Exotic Guidance for PLEIADES-HR Image Quality Calibration <i>L.Lebègue, Ph. Kubik, D. Greslou, F. DeLussy, N. Theret</i>	13
Increasing-Geometric Accuracy of DMC's Virtual Images <i>M. Madani, I. Shkolnikov</i>	19
Process Line for Geometrical Image Correction of Disruptive Microvibrations <i>F. de Lussy, D. Greslou, L. Gross-Colzy</i>	27
Tuz Gölü: New Absolute Radiometric Calibration Test Site <i>S. Gurol, H. Ozen, U. M. Leloglu, E. Tunali</i>	35
Aspects of the Standardization of Sensor and Data Fusion of Remote Sensing Data <i>R. Hoffmann, R. Reulke</i>	41
KOMPSAT-2 Direct Sensor Modeling and Geometric Calibration/Validation <i>Doo Chun Seo, Ji Yeon Yang, Dong Han Lee, Jeong Heon Song, Hyo Suk Lim</i>	47
Summary of Calibration and Validation for KOMPSAT-2 <i>Dong-Han Lee, D.C. Seo, J.H. Song, M.J. Choi, H.S. Lim</i>	53
Image Restoration of Calibration and Validation for KOMPSAT-2 <i>Dong-Han Lee, D.C. Seo, J.H. Song, J.H. Chung, S.Y. Park, M.J. Choi, H.S. Lim</i>	57
Destriping and inpainting of Remote Sensing Images Using Maximum A-Posteriori Method <i>Huanfeng Shen, Tinghua Ai, Pingxiang Li</i>	63
On-orbit Stellar Camera Calibration based on Space Resection with Multi-images <i>Xie Junfeng, Jiang Wanshou, Gong Jianya, Wang xiao</i>	71
The Use of Wavelets for Noise Detection in the Images Taken by the Analog and Digital Photogrammetric Cameras <i>K. Pyka, J. Siedlik</i>	77
In-flight Geometric Calibration - An experience with CARTOSAT-1 and CARTOSAT-2 <i>T. P. Srinivasan, B. Islam, Sanjay K. Singh, B. Gopala Krishna, P. K. Srivastava</i>	83
Multi Sensor Airborne Systems: The Potential for In Situ Sensor Calibration <i>N. Yastikli, C. Toth, D. Brzezinska</i>	89
Validation of MODIS Aerosol Optical Thickness Product Distributed by NSMC Over Seas Around China and Its Adjacent Area <i>L. Sun, X. Li, M. Guo</i>	95

WG I/2 SAR and LiDAR Systems

Surface Deformation Investigated With SBAS-DINSAR Approach Based on Prior Knowledge <i>HUANG Qi-huan, HE Xiu-feng</i>	99
Investigation of Elevation Bias of The SRTM C-And X-Band Digital Elevation Models <i>K.Becek</i>	105
DEM Registration, Alignment and Evaluation for SAR Interferometry <i>Zhengxiao Li, James Bethel</i>	111

Wavelet Speckle Reduction for SAR Imagery Based on Edge Detection <i>Yingdan Wu, Xiuxiao Yuan</i>	117
Coregistration Based on SIFT Algorithm for Synthetic Aperture Radar Interferometry <i>Fangting Li, Guo Zhang, Jun Yan</i>	123
A Joint Test Statistic Considering Complex Wishart Distribution Characterization of Temporal Polarimetric Data <i>Esra Erten, Andreas Reigber, Rafael Zandon'a Schneider and Olaf Hellwich</i>	129
Measurement of Dam Deformations by Terrestrial Interferometric Techiques <i>Mario Alba, Giulia Bernardini, Alberto Giussani, Pier Paolo Ricci, Fabio Roncoroni, Marco Scaioni, Paolo Valgoi, Katherine Zhang</i>	133
Recent Advances in Airborne InSAR for 3D Applications <i>Bryan Mercer, Qiaoping Zhang</i>	141
Monitoring of Recent Land Subsidence and Ground Fissures in Xi'an With SAR Interferometry <i>Chaoying Zhao, Xiaoli Ding, Qin Zhang, Zhong Lu, Zhiwei Li</i>	147
Atmospheric Effects Removal of ASAR-derived InSAR Products Using MERIS Data and GPS <i>S. Adham Khiabani, M. J. Valadan Zoej, M. R. Mobasheri, M. Dehghani</i>	151
Speckle Denoising Based on Bivariate Shrinkage Functions and Dual-Tree Complex Wavelet Transform <i>Shuai Xing, Dongyang Ma</i>	157
Radiometric Calibration of Full-Waveform Small-Footprint Airborne Laser Scanners <i>W. Wagner, J. Hyypää, A. Ullrich, H. Lehner, C. Briese, S. Kaasalainen</i>	163
An Investigation into The Registration of LIDAR Intensity Data and Aerial Images Using the SIFT Approach <i>Abbas Abedini, Michael Hahn, Farhad Samadzadegan</i>	169
Performance CharactErization of an Airborne LIDAR System: Bridging System Specifications and Expected Performance <i>V. Ussyshkin M. Boba, M. Sitar</i>	177
Practical Application of Multiple Pulse in Air (MPiA) LIDAR in Large Area Surveys <i>R. B. Roth, J. Thompson</i>	183
Using Road Pavement Markings as Ground Control for LIDAR Data <i>C. Toth, E. Paska, D. Brzezinska</i>	189
Adaptive Building Edge Detection by Combining LIDAR Data and Aerial Images <i>LI Yong, WU Huayi</i>	197
Error Budget of LIDAR Systems and Quality Control of the Derived Point Cloud <i>A. F. Habib, M. Al-Durgham, A. P. Kersting, P. Quackenbush</i>	203
Decomposition of Airborne Laser Scanning Waveform Data Based on EM Algorithm <i>Qi Li</i>	211
Alternative Procedures for the Incorporation of LIDAR-Derived Linear and Areal Features for Photogrammetric Geo-Referencing <i>A.F. Habib, M. Aldelgawy</i>	219
TerraSAR-X and TanDEM-X Revolution in Spaceborne Radar <i>Ralf Düring, Fifamè N, Marco Weber</i>	227
Exploring the Measurement Of Forests With Full Waveform LIDAR through Monte-Carlo Ray Tracing <i>Steven Hancock, Mathias Disney, Philip Lewis, Jan-Peter Muller</i>	235
Linear Feature Extraction of Buildings from Terrestrial LIDAR Data with Morphological Techniques <i>Jianghua Zheng, Tim Mccarthy, A. Stewart Fotheringham, Lei Yan</i>	241
Automatic Recognition of Rivers from LIDAR Data by Profile Factor <i>Y. Lin, L. Yan, Q. X. Tong</i>	245

Application of DInSAR and GIS for Underground Mine Subsidence Monitoring <i>Miao Fang, Yan Mingxing, Qi Xiaoying, Ye Chengming, Wang Baocun, Liu Rui, Chen Jianhua</i>	251
Urban Monitoring Using Persistent Scatterer InSAR and Photogrammetry <i>Junghum Yu, Alex Hay-Man Ng, Sungheuk Jung, Linlin Ge, and Chris Rizos</i>	257
Analyzing on Pixel Positioning Accuracy of SAR Images Based On R-D Location Model <i>H. B. Luo, X. F. He, M. He</i>	263
On The Quality Checking of the Airborne Laser Scanning Based Nation Wide Elevation Model in Finland <i>E. Ahokas, H. Kaartinen, J. Hyyppä</i>	267
Study on Application of Three-Dimensional Laser Scanning Imaging System in Tree Measuring <i>L. L. Wu, Z. K. Feng, X. Luo, X. R. Deng</i>	271
Application of 3D Laser Scanner for Monitoring of Landslide Hazards <i>Lichun SUI, Xue WANG, Dan ZHAO, Jia QU</i>	277
A Novel Method for Extracting Building from LIDAR Data--Fc-S method <i>REN Zizhen, ZHOU Guoqing, CEN Minyi, ZHANG Tonggang, ZHANG Qiyong</i>	283
Analysis and Recovery of Systematic Errors in Airborne Laser System <i>Zhihe Wang, Rong Shu, Weiming Xu, Hongyi Pu, Bo Yao</i>	289
Quality Control Method for Filtering in Aerial LIDAR Survey <i>Y. Yokoo, T. Ooishi</i>	295
An Approach to Optimize Reference Ground Control Requirements for Estimating LIDAR/IMU Boresight Misalignment <i>A. Pothou, C. Toth, S. Karamitsos, A. Georgopoulos</i>	301
Data Fusion with Integration of Airborne Laser Scanning Data and Ortho-aerial Photos <i>Hangbin Wu, Chun Liu, Xinhua Zhou</i>	309
A State of Art on Airborne LIDAR Application in Hydrology and Oceanography: A Comprehensive Overview <i>A. Mohammadzadeh, M. J. Valadan Zoj</i>	315
A Study of the RPC Model of TerraSAR-X And COSMO-SkyMed SAR Imagery <i>Guo Zhang, Xiaoyong Zhu</i>	321
Research on Precise Geometry Model of Synthetic Aperture Radar Interferometry <i>Song Shujing, Liu Yihua, Jiao Jian, Zeng Qiming</i>	325
Laser Footprint Size and Pointing Precision Analysis for LIDAR Systems <i>Xu Bin, Li Fangfei, Zhang Keshu, Lin Zongjian</i>	331
An Insitu Single-pointed Wavelet-Based Method for Noise Reduction in SAR Images <i>Huan Gu, Guo Zhang, Jun Yan</i>	337
Forest Height Estimation from INDREX-II L-Band Polarimetric InSAR Data <i>Q. Zhang, J.B. Mercer, S.R. Cloude</i>	343
Fusion and Optimization of LIDAR and Photogrammetric Technologies and Methodologies for Cartographic Production <i>A. Díez, A. Arozarena, S. Ormeño, J. Aguirre, R. Rodríguez, A. Sáenz</i>	349
Multi-photo Combined Adjustment with Airborne SAR Images Based on Fleberl Ortho-rectification Model <i>X.J. Yue, G.M. Huang, Y. Zhang, Z. Zhao, L. Pang</i>	357
Remote Monitoring of a Landslide Using an Integration of GB-InSAR and LIDAR Techniques <i>A. Lingua, D. Piatti, F. Rinaudo</i>	361
Integrated Airborne IFSAR Mapping System	

<i>Ming Wei and Tim Coyne</i>	367
On Improvement of Accuracy of Airborne Laser Scanner Data Using Digital Images <i>Kazuya NAKANO, Hirofumi CHIKATSU</i>	373
A Comparison of Estimating Forest Canopy Height Integrating Multi-sensor data Synergy--A Case Study in Mountain Area of Three Gorges <i>Lixin Dong, Bingfang Wu</i>	379
LIDAR Strip Adjustment using Conjugate Linear Features in Overlapping Strips <i>A. F. Habib, A. P. Kersting, Z. Ruifang, M. Al-Durgham, C. Kim, D. C. Lee</i>	385
Integration of Terrestrial and Airborne LIDAR Data for System Calibration <i>Ki In Bang, Ayman F. Habib, Kresimir Kusevi, Paul Mrstik</i>	391
Study on Airborne SAR Image Matching Using Epipolar <i>Xiaoman Luo, Guoman Huang, Lei Pang, Zheng Zhao</i>	399
Research on SAR Image Matching Technology based on SIFT <i>LIU Jing-zheng, YU Xu-chu</i>	403
Fast Continuous 360 Degree Color 3D Laser Scanner <i>Aiwu Zhang, Shaoxing Hu, Yulin Chen, Haiyun Liu, Fan Yang, Jia Liu</i>	409
Managing Full Waveform LIDAR Data: A Challenging Task for the Forthcoming Years <i>F. Bretar, A. Chauve, C. Mallet, B. Jutzi</i>	415
A Progressive Quality Control to Improve the Accuracy of LIDAR Data Processing <i>Xiaodong Zhi, Liang Zhong</i>	421
Comparison of Tree Extraction from Intensity Drop and From Multiple Returns in ALS Data <i>C. Örmeci, S. Cesur</i>	427
Image Coregistration in SAR Interferometry <i>Zhengxiao Li, James Bethel</i>	433
Data Simulation of Ladar Sensor: Focusing on Geometric Modeling <i>Seonghong Min, Seongjoon Kim, Impyeong Lee</i>	439
Influence on Height Measure from Earth Curvature Based on Spaceborne InSAR <i>Zhenghao, Tang Xiaotao, Niu Rui, Chen Gang, Liu Zhiming</i>	445
Research on Spaceborne InSAR Images Registration and Removal of the Effect of the Flat Earth <i>H. Lin, L.P. Zhang, Z. L. Hu, H.T. Jing</i>	449
Fast Reconstruction of Three Dimensional City Model Based on Airborne LIDAR <i>H. Lin, H.T. Jing, L.P. Zhang</i>	453
Application of GPS in Distributed SAR Satellite <i>Chen Junli Zhu jie</i>	459
A Database Approach to Very Large LIDAR Data Management <i>LIU Hua, HUANG Zhengdong, ZHAN Qingming, LIN Peng</i>	463
Data Management Based on Geocoding Index And Adaptive Visualization for Airborne LIDAR <i>Xiaodong Zhi, Keshu Zhang, Guozhong Su</i>	469
WG I/3 Multi-platform Sensing and Sensor Networks	
Registration of Airborne Laser Scanning Point Clouds with Aerial Images through Terrestrial Image Blocks <i>Petri Rönholm, Eija Honkavaara, Anna Erving, Milka Nuikka, Henrik Haggrén, Sanna Kaasalainen, Hannu Hyyppä, Juha Hyyppä</i>	473
A New Approach to Spatio-Temporal Calibration of Multi-sensor Systems <i>M. Blázquez</i>	481

Automatic Registration Between LIDAR and Digital Images <i>Deng Fei, HuMinjie, Guan HaiYan</i>	487
GPS-GIS Integrated System for Electromagnetic Pollution <i>A. Ammoscato, R. Corsale, G. Dardanelli, A. Scianna, B. Villa</i>	491
System Requirements and Mission Analysis for Spaceborne SAR Interferometry Based on Formation Flying Satellites <i>ZHANG Running, LI Yang, LIU Shengli</i>	499
Contribution of Integrated Remote Sensing System (SINAT) to Territorial Management: Towards the Strengthening of the National System of Land Observation. <i>Ludwing Gronemeyer Crestto</i>	503
WG I/4 Airborne Digital Photogrammetric Sensor Systems	
Accuracy Analysis of Large Size Digital Aerial Cameras <i>R. Passini, K. Jacobsen</i>	507
DMC Virtual Image Characterization: Experiences at ICC <i>R. Alamús, W. Kornus, J. Talaya</i>	515
Geometric Aspects Concerning the Photogrammetric Workflow of the Digital Aerial Camera UltraCamX <i>Richard Ladstädter, Michael Gruber</i>	521
Initial Evaluation of the Second-generation Leica ADS40 Camera <i>V. Casella, M. Franzini, G. Banchini, G. Gentili</i>	527
Small Format Digital Sensors for Aerial Imaging Applications <i>P. M. Dare</i>	533
Radiometric Quality of Ultracam-X Images <i>S. Schneider , M. Gruber</i>	539
Comparative Properties of Four Airborne Sensors and their Applicability to Land Surface Interpretation <i>P.H. Rosso, S. Klonus, M. Ehlers and E. Tschach</i>	545
Trends for Digital Aerial Mapping Cameras <i>Klaus J. Neumann</i>	551
Calibrating Digital Photogrammetric Airborne Imaging Systems in a Test Field <i>Eija Honkavaara, Lauri Markelin, Eero Ahokas, Risto Kuittinen, Jouni Peltoniemi</i>	555
Driving Toward A Worldwide Acceptance Procedure for Digital Airborne Sensors <i>G. Stensaas and G. Lee</i>	561
Statistical Study of Space Remote Sensors <i>Z. Ghadyani, S. Afshar Naseri, S. Adham khiabani</i>	567
Triangulation of Airborne Three-Line Images Using Unit Quaternion <i>Liu Jun, Wang Donghong, Zhang Yongsheng</i>	573
An Optimally Integrated Direct Georeferencing and Flight Management System for Increased Productivity of Airborne Mapping and Remote Sensing <i>A.W.L. Ip, M.M.R. Mostafa, J. Hutton, J.P. Barriere</i>	579
Geometric and Automatic Mosaic Method with Collinear Equation for Aviation Twice-Imaging Data... <i>Lei Yan, Zhi-yang Gou, Shi-hu Zhao, Mao-di Su</i>	585
GPU-based Orthorectification of Digital Airborne Camera Images in Real Time <i>U. Thomas, F. Kurz, D. Rosenbaum, R. Mueller, P. Reinartz</i>	589
Design and Actualization of the Aerial Photogrammetric System of the Low Altitude Unmanned Biplane <i>Zhang Qiang</i>	595
An Effective Methodology of Using GPS/IMU Data for Automatic Point Transformation in Aerial Triangulation	

<i>Yang Ming, Xiuxiao Yuan</i>	601
Application and Accuracy Evaluation of Leica ADS40 for Large Scale Mapping <i>Wenyuan Hu, Gengyin Yang, Hui Yuan</i>	605
Geometric Accuracy Investigation of Vexcel UltracamD <i>Kikuo Tachibana, Michael Gruber, Hideki Shimamura</i>	611
Theoretical Accuracy of Direct Georeferencing with Position and Orientation System in Aerial Photogrammetry <i>Xiuxiao Yuan, Xueping Zhang</i>	617
Calibration and Validation of Aerial Photogrammetric Systems Which Utilize Solar Images for Determining Aerial Camera Tilt Angles <i>U. Ethrog, G. Even-Tzur</i>	623
Geometric Accuracy Assessment of ADS40 Imagery under Various Network Configurations <i>V. Casella, M. Franzini, S. Kocaman, A. Gruen</i>	627
Establishing a Camera-IMU Calibration Procedure for the Spanish National Orthophoto Program <i>D.A. Nafria, B. Arias, V. Blanco, O.O. Rodriguez, M. Blanco, F.J. Antolin, J. Gómez</i>	633
The Design and Realization of Large Plane Colour CCD Digital Aerial Camera System <i>WU Yundong, WANG Zhongxun, WANG Hui</i>	639
Actualize of Low Altitude Large Scale Aerophotography and Geodesic base on Fixed-Wing Unmanned Aerial Vehicle Platform <i>Baoping Li, Xinpu Sheng, Zhiyu Xia, Chengwen E, Bing Li</i>	643
Geometric Analysis of Vexcel Imaging UltraCam_x Test flights <i>U. Mansholt, R. Ladstaedter</i>	647
Stochastic Modeling and Triangulation for an Airborne Three Line Scanner <i>W. Jung, J. S. Bethel</i>	653
Twice-Imaging Airborne Camera System with Distributed Sensors <i>S. H. Zhao, L. Yan, X. H. Duan, Y. K. Wu, T. T. Shen, M. D. Su</i>	657
Key Technologies Research Based on SWDC Aerial Photogrammetric Camera Flight Management System <i>Lu Xiaoping, Li Tianzi, Ji Wenjie</i>	661
UltraCamX, The Large Format Digital Aerial Camera System by Vexcel Imaging / Microsoft <i>Michael Gruber, Martin Ponticelli, Stefan Bernögger, Franz Leberl</i>	665
Aerial Triangulation of Digital Aerial Imagery Using Hybrid Features <i>F. Samadzadegan, P. Ramzi, Iran, T. Schenk</i>	671
Digital Cameras for a Photogrammetric Production Environment: a Test of the Geometric Stability and Accuracy <i>O. Kissiyar, T. Vanderstraete, R. Kroon, B. Verbeke</i>	677
Radiometric and Geometric Evaluation of the Capabilities of the New Airborne Digital Photogrammetric Sensors <i>D. Emmolo, P. Orlando, B. Villa</i>	681
New Developments on Pushbroom Sensors <i>Daniel Bachofen, Werner Kirchhofer, Tauno Saks, Patrick Steinmann, Huangqi Sun, Lukas Vonblon, Ruedi Wagner, Felix Zuberbühler</i>	687
Research of Producing and Managing Topographic Mapping and Building Data in One System Harmoniously <i>Zhao libin, Xie lurong, Guo xincheng</i>	691
The Interior and Exterior Calibration for Ultracamd <i>K. S. Qtaishat, M. J. Smith, D. W. G. Park</i>	695

WG I/5 Geometric Modeling of Optical Spaceborne Sensors and DEM Generation

Satellite Image Orientation <i>K. Jacobsen</i>	703
Improvement of the Stability Solving Rational Polynomial Coefficients <i>Xianyong Lin, Xiuxiao Yuan</i>	711
Long Strip Modelling for CARTOSAT-1 with Minimum Control <i>Amit Gupta, Jagjeet Singh Nain, Sanjay K Singh, T P Srinivasan, B Gopala Krishna, P K Srivastava</i>	717
An Improved Pushbroom Scanner Model for Precise Georeferencing of ALOS Prism Imagery <i>T. Weser, F. Rottensteiner, J. Willneff, C. S. Frase</i>	723
Geometric Modeling and Validation of ALOS/PRISM Imagery and Products <i>S. Kocaman, A. Gruen</i>	731
Stereo Evaluation of ALOS/PRISM Data on ESA-AO Test Sites – First DLR Results <i>Mathias Schneider, Manfred Lehner, Rupert Müller, Peter Reinartz</i>	739
An operational System for Sensor Modeling and DEM Generation of Satellite Pushbroom Sensor Images <i>Y. Wang, X. Yang, F. Xu, A. Leason, S. Megenta</i>	745
An Indirect Generalization of Contour Lines Based on DEM Generalization Using the 3D Douglas-Peucker Algorithm <i>FEI Lifan, HUANG Lina, HE Jin</i>	751
The Research and Design of the Base-height Ratio for the Three Linear Array Camera of Satellite Photogrammetry <i>Li Jing, Shao Yong-she, Wang Jian-rong, Yang Jun-feng</i>	757
Elevation-Controlled Block Adjustment for Weakly Convergent Satellite Images <i>Liang-Chien Chen,, Tee-Ann Teo, and Chao-Yuan Lo</i>	761
Calibration of Constant Angular Error for CBERS-2 Imagery with Few Ground Control Points <i>Junpeng YU, Xiuxiao, YUAN Zhenli WU</i>	769
DEM (Digital Elevation Model) Production and Accuracy Modeling of DEMs from 1:35.000 Scale Aerial Photographs <i>G. Toz, M. Erdogan</i>	775
InSAR Imaging Geometry Simulation Based on Computer Graphics <i>Fan Zhang, Lu Bai, Wen Hong</i>	781
Generation of Digital Surface Model from High Resolution Satellite Imagery <i>Chunsun Zhang, Clive Fraser</i>	785
Reconstruction of 30m DEM from 90m Srtm DEM with Bicubic Polynomial Interpolation Method <i>Chaiyapon Keeratikasikorn , Itthi Trisirisatayawong</i>	791
Least Square Matching Model AMMGC-LSM for Multi-line-array Digital Images <i>Fan Dazhao, Lei Rong, Ji song</i>	795
Investigation of 3D Geopositioning and DEM Accuracy of CARTOSAT-1 Stereo Imagery <i>A. Yilmaz, O.T. Ozerbil, O.Eker, M.Erdogan, E.E.Maras</i>	799
Research on Models Mergence Algorithm Based on Delaunay Triangulation <i>CHEN Genggen, OUYANG Ping, LIU Shaohua, XIAO Genru.</i>	805
Topographic Mapping and Terrain Modeling from Multi-Sensor Satellite Imagery <i>Amy K.Y. Li and Tania Batchvarova</i>	809
Filtering Process of LIDAR Data <i>BADEA Dragos, JACOBSEN Karsten.</i>	815
The Accuracy Assessment Experimentof Aster 3D Ortho Product in Beijing Area	

<i>LI Baipeng, YAN Qin, CHENG Chunquan, WEI Yanliang</i>	821
Correcting DEM Extracted from Aster Stereo Images by Combining Cartographic DEM <i>Jin-Duk Lee, Seung-Hee Han, Sung-Soon Lee, Jin-Sung Park</i>	829
Monitoring of Height Changes in Urban Areas from Multi-Temporal, Multi-Scale and Multi-Platform Remotely Sensed Data <i>Jorge Luís Nunese Silva Brito, Marcelo Teixeira Silveira, Karsten Jacobsen, Sandro Amorim, Guilherme Lúcio Abelha Mota, Raul Queiroz Feitosa, Christian Heipke</i>	835
Evaluation of CARTOSAT 1 Geometric Potential <i>P.S. Titarov</i>	841
Camera Station Based Combiner Adjustment of Multi-Images <i>CHENG Chunquan, ZHANG Jixian, DENG Kazhong, YAN Qin</i>	847
A DEM Construction Method for Inconstant Inter-Tidal Zone Base on Short-Interval, High Frequency MODIS Data Set: A Case Study in the Dongsha Sandbank of the Jiangsu Radial Tidal Sand-Ridges <i>Liu Yong-xue, Li Man-chun, Song Ke, Yang Jing, Li Xue</i>	853
Light Aberration Effect in HR Geometric Model <i>D. Greslou, F. De Lussy, J. Montel</i>	859
DSM Generation with High Resolution Space Imagery over Mountainous Forest Area <i>G. Buyuksalih, K. Jacobsen</i>	865
Transformation between Rational Function Model and Rigorous Sensor Model for High Resolution Satellite Imagery <i>S.J. Liu, X.H. Tong</i>	873
Experimental Realization of Urban Large-Scale True Orthoimage Generation <i>Wenhan Xie, Guoqing Zhou</i>	879
Rational Polynomial Modelling for CARTOSAT-1 data <i>Sanjay K Singh, S Devakanth Naidu, T P Srinivasan, B Gopala Krishna, P K Srivastava</i>	885
Capability Assessment of High Resolution Satellite Imagery for 3D Reconstruction Using RPC Parameters <i>F. Samadzadegan, P. Ramzi, A. Abootalebi</i>	889
A Hybrid Method for Stereo Image Matching <i>M. T. Silveira, R. Q. Feitosa, K. Jacobsen, J. L. N. S. Brito, Y.Heckel</i>	895
Trajectory Modeling for Satellite Image Triangulation <i>In-seong Jeong, James Bethel</i>	901
Modeling of Absolute Orientation of Adjacent Satellite Image Strips Using A Few Ground Control Points <i>Dongwook Kim, Taejung Kim</i>	909
Automated Update of Existing Ortho-Image Database and DEM Using High resolution Satellite Images <i>Taeyoon Lee, Jae Hoon Jeong, Taejung Kim, Wanyong Park</i>	913
WG I/6 Small Satellites	
Potential for Advancements in Remote Sensing Using Small Satellites <i>R. Sandau, K. Brieß</i>	919
Proba Spacecraft Family Small Mission Solutions for Emerging applications <i>Jo Bermyn</i>	925
Property and Removal of Jitter in Beijing-1 Small Satellite Panchromatic Images <i>Qiong Ran, Yaobin Chi, Zhiyong Wang</i>	929
The Aerospace Imaging Interferometer Aliseo: Further Improvements of Calibration Methods and Assessment of Interferometer Response <i>A. Barducci, F. Castagnoli, G. Castellini, D. Guzzi, P. Marcoionni, I. Pippi</i>	935

Research on “Beijing 1” Micro-satellite Image Quality and Land Use Classification Precision <i>WANG Qian</i>	941
Construction of Star Catalogue Based on SVM <i>Zhang Rui, Jiang Ting</i>	945
The Method on Generating LAI Production by Fusing BJ-1 Remote Sensing Data and MODIS LAI Product <i>Jinling Song, Jindi Wang, Yueting Xiao, Yanmin Shuai, Wan Huawei</i>	949

ICWG I/V Autonomous vehicle navigation

Towards Autonomous Mars Rover Localization: Operations in 2003 MER Mission and New Developments for Future Missions <i>K. Di, J. Wang, S. He, B. Wu, W. Chen, R. Li, L. H. Matthies, A. B. Howard</i>	957
Integration of GPS/INS/Vision Sensors to Navigate Unmanned Aerial Vehicles <i>Jinling Wang, Matthew Garratt, Andrew Lambert, Jack Jianguo Wang, Songlai Han, David Sinclair</i>	963
Indoor Navigation by Using Segmentation of Range Images Obtained by Laser Scanners <i>B. Gorte, K. Khoshelham, E. Verbree</i>	971
The Autonomous Mini Helicopter: A Powerful Platform for Mobile Mapping <i>Henri Eisenbeiss</i>	977
A Collaborative Epidemical Surveillance and Response System Based on GIS and Information Technique <i>HU Bisong, GONG Jianhua, SUN Jia, CAO Wuchun, FANG Liqun</i>	985
Optical/SAR Sensors Stereo Positioning <i>Shuai Xing, Qing Xu, Yan Zhang, Yu He, Guowang Jin</i>	993
Use of Geographical Information Systems in Analyzing Vehicle Emissions: Istanbul as a Case Study <i>M.Umit Gumusay, Alper Unal, Rukiye Aydin</i>	997

Theme Session: Sensor networks and homeland security

Ad-Hoc Wireless Sensor Positioning in Hazardous Areas <i>R. Mautz, W. Y. Ochieng, H. Ingensand</i>	1001
A New Peer-to-Peer-based Interoperable Spatial Sensor Web Architecture <i>S.H.L. Liang</i>	1009
Performance Evaluation of Data Disseminations for Vehicular Ad Hoc Networks in Highway Scenarios <i>XIONG Wei, LI Qing-Quan</i>	1015
Near-Space Passive Remote Sensing for Homeland Security: Potential and Challenges <i>Wen-Qin Wang</i>	1021
Ecosystem Health Assessment in Inner Mongolia Region Based on Remote Sensing and GIS <i>Yan Ding, Wen Wang, Xiaoqian Cheng, Shuping Zhao</i>	1029
Research on Date Collecting and Rapid Map Updating of Forest Resources Based on 3S Technology <i>Yuan Zhanliang, Li Aiguo and Yie Ting</i>	1035
Technical Assistance for the Ministry of Agriculture and Rural Affairs for the Design of a Functioning IACS and LPIS in Turkey <i>H. Erden, E. Mercimek</i>	1039

Theme Session: Medium Format Digital Cameras

Medium Format Digital Cameras - a EuroSDR project <i>G. J. Grenzdörffer</i>	1043
Results of A Performance Test of a Dual Mid-Format Digital Camera System <i>Jens Kremer, Michael Cramer</i>	1051

Standards and Specifications for the Calibration and Stability of Amateur Digital Cameras for Close-Range Mapping Applications	
<i>A. Habib, A. Jarvis, I. Detchev, G. Stensaas, D. Moe, J. Christopherson</i>	1059
Pictometry's Proprietary Airborne Digital Imaging System and Its Application in 3D City Modelling	
<i>Yandong Wang, Steve Schultz, Frank Giuffrida</i>	1065
Influence Factors Evaluation on High-precision planar Calibration of Non-metric Digital Camera	
<i>Wenjin Wang, Bingxuan Guo, Xin Li, Jing Cao</i>	1071
Geometric Calibration of the Hasselblad H3D Medium Format Camera	
<i>A. Fauner, R. Ladstädter, V. Kaufmann</i>	1077
Appearance Based 3D Object Recognition Using IPCA-ICA	
<i>V.K Ananthashayana and Asha.V</i>	1083

Theme Session: DEM generation with High Resolution Optical Satellite Sensors

Generation of COARSE 3D Models of Urban Areas from High Resolution Stereo Satellite Image	
<i>Thomas Krauß, Manfred Lehner, Peter Reinartz</i>	1091
DEM Generation from High Resolution Multi-View Data product	
<i>B. Gopala Krishna, Amitabh, T P Srinivasan, P K Srivastava</i>	1099
Up to Date DSM Generation Using High Resolution Satellite Image Data	
<i>K. Wolff, A. Gruen</i>	1103
Multi-Image Matching for DTM Generation from SPOT-5 HRS/HRG and IRS-P5 Imagery - For the Project of West China Topographic Mapping at 1:50,000 Scale	
<i>ZHANG Li, ZHANG JiXian, Wang ShaoCheng</i>	1109
Utilization Potential of High Resolution Stereo Data for Extracting DEM and Terrain Parameters	
<i>P. Jayaprasad, Ritesh Agrawal, S. K. Pathan</i>	1117
An Evaluation on the Data Quality of Srtm DEM at the Alpine and Plateau area, North-Western of China	
<i>Y. Liu</i>	1123
Analysis of Reliability and Impact Factors of Mutual Information Similarity Criterion for Remote Sensing Imagery Template Matching	
<i>H.L. Wang, R. An, Q. Zhang, C.Y. Chen</i>	1129
Assessment of ALOS Prism Digital Elevation Model Extraction over Japan	
<i>F. Bignone, H. Umakawa</i>	1135
Blunder Elimination Techniques in Adaptive Automatic Terrain Extraction	
<i>Fengliang Xu, Neil Woodhouse, Zhizhong Xu, David Marr, Xinghe Yang, Younian Wang</i>	1139
Accuracy Investigation of Orthoimages Obtained from High Resolution Satellite Stereo Pairs	
<i>L. Zhu, H. Umakawa, F. Guan, K. Tachibana, H. Shimamura</i>	1145
Analysis of Rational Function Dependency to the Height Distribution of Ground Control Points in Geometric Correction of Aerial and Satellite Images	
<i>M. Hosseini</i>	1149
An Integrated Feature Based Method for Sub-Pixel Image Matching	
<i>Weili JIAO, Yaling FANG, Guojin HE</i>	1157
An Accuracy Assessment of CARTOSAT-1 Stereo Image Data-Derived Digital Elevation Models: A Case Study of the Drum Mountains, Utah	
<i>Gayla A. Evans, Bhaskar Ramachandran, Zheng Zhang, G. Bryan Bailey, and Philip Cheng</i>	1161
Research on a Correction Method to Existing Grid-based DEM	
<i>LIU Xuejun, CHE Weitao, WANG Chun</i>	1165
Evaluation of LBTM for HRSI Rectification	

<i>Sun Yushan, Ahmed Shaker, Wenzhong Shi</i>	1171
Orientation and DEM Extraction from ALOS-PRISM Images Using the SRTM-DEM as Ground Control <i>J. A. Gonçalves</i>	1177
Theme Session: UAV FOR MAPPING (1)	
UAV for Mapping—Low Altitude Photogrammetric Survey <i>LIN Zongjian</i>	1183
The Use of Unmanned Aerial Vehicles (UAVS) for Remote Sensing and Mapping <i>J. Everaerts</i>	1187
A Light-Weight Multispectral Sensor for Micro UAV – Opportunities for Very High Resolution Airborne Remote Sensing <i>S. Nebiker, A. Annen, M. Scherrer, D. Oesch</i>	1193
Towards A New Paradigm for High-Resolution Low-Cost Photogrammetry and Remote Sensing <i>I. Colomina, M. Blázquez, P. Molina, M.E. Parés and M. Wis</i>	1201
The Photogrammetric Potential of Low-Cost UAVS in Forestry and Agriculture <i>G. J. Grenzdörffer, A. Engel, B. Teichert</i>	1207
UAV Borne Mapping by Multi Sensor Integration <i>Masahiko Nagai, Tianen Chen, Afzal Ahmed, Ryosuke Shibasaki</i>	1215
A Contrast among Experiments in Three Low-altitude Unmanned Aerial Vehicles Photography: Security, Quality & Efficiency <i>WU Yundong, ZHANG Qiang, LIU Shaoqin</i>	1223
UAV-Based Augmented Monitoring – Real-Time Georeferencing and Integration of Video Imagery with Virtual Globes <i>H. Eugster and S. Nebiker</i>	1229
Position and Orientation Data Requirements for Precise Autonomous Vehicle Navigation <i>Louis Nastro</i>	1237
The Error Analysis and Correction Method Research of the Attitude Data for the UAV Remote Sensing Images <i>Hongying Zhao, Yuanchen Qi</i>	1243
Calibration Strategy for the Medusa Camera System <i>K. Nackaerts, J. Everaerts, R. Choi, B. Delauré, T. Van Achteren, J. Biesemans</i>	1247
Special Session: Operation and International Coordinate for Earth Observing Systems	
Digital Elevation Model Database W42 - A Scalable System for Spatial Data <i>M. Habermeyer, U. Marschalk, A. Roth</i>	1253
Special Session: Modern Navigation and Earth Observation	
Accurate DSM Production from Unmanned Helicopter Systems <i>R. B. Haarbrink, H. Eisenbeiss</i>	1259
The Future Spaceborne Hyperspectral Imager EnMAP: Its Calibration, Validation, and Processing Chain <i>T. Storch, A. de Miguel, R. Müller, A. Müller, A. Neumann, T. Walzel, M. Bachmann, G. Palubinskas, M. Lehner, R. Richter, E. Borg, B. Fichtelmann, T. Heege M. Schroeder and P. Reinartz</i>	1265
The Influence on Image Quality under Relative Calibration Accuracy <i>Hu Yongfu, Zhang Yufeng, Zong Xiaoying</i>	1271
A Navigation Data Model Based on the Syncretic Multi-Layer Roadway Network <i>Baojun Zhao, Xiaohang Cao, Jinhui, Xu</i>	1275

Special Session: SS 11 - CARTOSAT-SAP

Synthesis of Investigations under ISPRS-ISRO CARTOSAT-1 Scientific Assessment Programme Primarily for DSM Generation <i>R. Nandakumar, Amitabh, MPT Chamy, Satya Soma Sekhar Kopparthi, Gurudev Paswan, Shilpa Prakash & Sanjay Singh</i>	1279
Precise Georeferencing of CARTOSAT Imagery via Different Orientation Models <i>J. Willneff, T. Weser, F. Rottensteiner, C. S. Fraser</i>	1287
Stereo Evaluation of CARTOSAT-1 Data Summary of DLR Results During CARTOSAT-1 Scientific Assessment Program <i>Manfred Lehner, Pablo d'Angelo, Rupert Müller, Peter Reinartz</i>	1295
Exterior Orientation Improved by the Coplanarity Equation and DEM Generation for CARTOSAT-1 <i>Pantelis Michalis and Ian Dowman</i>	1301
CARTOSAT-1: Orientation, DEM and Orthorectification Quality Assesment <i>R. Dabrowski, W. Fedorowicz-Jackowski, M. Kedzierski, P. Walczykowski, J. Zych</i>	1309
Assessment of the Area Measurement on CARTOSAT-1 Image <i>Joanna Pluto-Kossakowska, David Grandgirard, Rafał Zieliński, Simon Kay</i>	1315
Geometric Potential of CARTOSAT-1 Stereo Imagery <i>M. Crespi, F. Fratarcangeli, F. Giannone, G. Colosimo, F. Pieralice, K. Jacobsen</i>	1323
Multi-Scale Digital Terrain Model Generation Using CARTOSAT-1 Stereo Images for the Mausanne Les Alpilles Test Site <i>Marco Gianinetto</i>	1331
Preliminary Research on Position Accuracy of CARTOSAT-1 <i>Liping Zhao, Fengde Liu, Wei Wang, Jian L</i>	1337
Analysis of DEM Generated Using CARTOSAT-1 Stereo Data Over Mausanne Les Alpilles – CARTOSAT Scientific Appraisal Programme (CSAP TS – 5) <i>Y V N Krishna Murthy, S Srinivasa Rao, D.S. Prakasa Rao, V. Jayaraman</i>	1343
Radiometric Quality and DSM Generation Analysis of CARTOSAT -1 Stereo Imagery <i>M. Crespi, L. De Vendictis, D. Poli, K. Wolff, G. Colosimo, A. Gruenb, F. Volpe</i>	1349
Improvements in CARTOSAT -1 Stereo Orthokit Data Products Since Launching ISPRS-ISRO CARTOSAT -1 Scientific Assessment Programme <i>R. Nandakumar*, Shilpa Prakash, B. Kartikeyan, MPT Chamy, Sanjay Singh, TP Srinivasan, Amitabh, B. Gopala Krishna, Santanu Chowdhury & PK Srivastava</i>	1357
Geometric Validation of CARTOSAT -1 Imagery <i>S. Kocaman, K. Wolff, A. Gruen, E. Baltsavias</i>	1363
Validation of CARTOSAT -1 DTM Generation for the Salon de Provence Test Site <i>Marco Gianinetto, Francesco Fassi</i>	1369